

Attorney's Docket No. AL.US.16

**PATENT****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Joanna L. Duncan,  
Christopher R. McLarnon, and Francis R. Alix  
Serial No.: 10/707,340  
Confirmation No.: 1339  
Filed: 12/05/2003  
For: NO<sub>x</sub>, Hg, AND SO<sub>2</sub> REMOVAL USING  
AMMONIA

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Examiner: unknown  
Group Art Unit: 1754

**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**DECLARATION BY INVENTOR IN SUPPORT OF PETITION TO MAKE SPECIAL  
UNDER THE ENERGY PROGRAM AND BECAUSE OF  
ENVIRONMENTAL QUALITY (37 CFR 1.102(c))**

I, Joanna L. Duncan, Ph.D., employed by the assignee of this application Powerspan Corp., P.O. Box 219, 54 Old Bay Road, New Durham, New Hampshire 03855, Tel. No. (603) 859-2500, am the first named inventor in the present application, and make the following declarations:

1. That this invention materially enhances the quality of the environment in that it is designed to remove at least 90% of the SO<sub>2</sub>, NO<sub>x</sub>, mercury and fine particles (PM<sub>2.5</sub>) from the exhaust gas of coal fired power plants.

2. That this invention materially enhances the quality of the environment by producing industrially the beneficial chemicals ammonium sulfate and ammonium nitrate, as byproducts instead of making waste products which must be land-filled. Ammonium sulfate and ammonium nitrate are well known as valuable agricultural fertilizers.

3. That this invention materially contributes to the more efficient utilization and conservation of energy because it will help coal-fired power plants meet more stringent air emissions limits at significantly lower costs than with available alternatives. These limits apply under existing federal and state regulations as well as under pending regulation through existing programs. Existing regulations including the Clean Air Act Amendments of 1990, the National Ambient Air Quality Standards, and the regional Ozone Transport Rule collectively limit particles, SO<sub>2</sub>, and NO<sub>x</sub> emissions.

Additional reductions of SO<sub>2</sub> and NOx will be required in the next decade and beyond to comply with the revised Ozone and Particulate Matter National Ambient Air Quality Standards that are set at a level to adequately protect public health and the environment, the Regional Haze Rule announced in 2001 to protect national park vistas, and settlements arising from New Source Review which will require older power plants to modernize their pollution control equipment.

Of additional concern is mercury. In its 1998 Utility Air Toxics Report to Congress, the U.S. Environmental Protection Agency identified mercury emissions from fossil fuel-fired power plants as the toxic air pollutant of greatest concern for public health. Mercury, when deposited to water and land, bioaccumulates in the food chain and can contribute to human brain and nervous system dysfunction. The U.S. EPA must issue a final mercury standard for oil- and coal-fired power plants by 2004 with compliance expected by 2007.

4. That this invention materially contributes to the more efficient utilization and conservation of energy for the reason that it will reduce the frequency power plants must operate below capacity, *i.e.* "de-rate," to avoid exceeding emissions limits. It is well known that the closer a plant is operated to its capacity, the less efficiently the pollution control equipment, *e.g.* electrostatic precipitator, operates. Some of the results of derating are that brownouts and blackouts can occur during times of high demand, and utilities may have to start up inefficient back-up generating stations. By collecting particles, SO<sub>2</sub>, NOx, and even Hg in a cost-effective apparatus such as this invention, coal fired power plants will be able to operate closer to their rated capacity without exceeding emissions limits.

5. That I have made a search of the pertinent prior art. All such material art was provided to the Examiner in an Information Disclosure Statement.

6. That I believe all the claims in this application as on file are allowable.

7. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 12/31/03

Joanna L. Duna  
(Signature)